UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,703	12/14/2001	Bradley A. Payne	SNS-009A	5733

21323 7590 05/12/2004

TESTA, HURWITZ & THIBEAULT, LLP
HIGH STREET TOWER
125 HIGH STREET
BOSTON, MA 02110

EXAMINER	
NGUYEN, KIMBINH T	

ART UNIT	PAPER NUMBER
2671	

DATE MAILED: 05/12/2004 / 0

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/017,703	Applicant(s) PAYNE, BRADLEY A.	
	Examiner Kimbinh T. Nguyen	Art Unit 2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,12-27 and 32-40* is/are rejected.

7)☒ Claim(s) *8-11 and 28-31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7,9*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to amendment filed 2/23/04.

2. Claims 1-40 are pending in the application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-7, 13-27, 30, 31, 33-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Milliron (6,608,631).

Claim 1, Milliron discloses defining on a multi-dimensional space (3D volume) an array of geometrical shape (points, line segments, rectangles and/or boxes; col. 19, lines 36-53; fig. 12A; col. 26, lines 42-43); selecting a modification function to be applied to the geometrical shape (deforming function; col. 29, line 23); applying an inverse function of the modification to the array of values to produce a modified array (applying the inverse function transformation inverts the deformation caused by this deforming function, computation of the inverse warp to provide parameterized transformations, strength fields, weighting fields for the inverse warp (a new warp), col. 29, lines 24-59);

deducing (the set of scaled transformations is derived using the displacement method; col. 17, lines 66-67) from the modified array a modification of the geometrical shape (swapping the features has the effect of inverting the warp's parameterized transformations; col. 29, lines 54-63;) that would result from a direct application of the modification function to the array (the set of strength fields, and the set of weighting fields should evaluate to the same values on both the underformed model and deformed model, col. 29, lines 60-63; parameterized transformations may be constructed so that each point on a source feature corresponds to a single transformation value that maps the point on the source feature to a corresponding point on the target feature (result from a direct application), col. 28, lines 48-52).

Claims 2, 3, Milliron discloses applying the deduced modification to the array (a feature-based warp is interpolating (applying) on a source feature, a model point M(u); col. 28, lines 53-65); displaying the modification of the geometrical shape (a feature based-warp may be visually; col. 28, line 67 through col. 29, line 1).

Claims 4, 6, Milliron discloses retrieving an array value from the modified array and applying the array value at a location from a first side and second side of the geometrical shape (the set of weighting fields corresponding to the set of feature specification is selected to warp each model point at nearest location on the reference curve; col. 22, lines 19-67).

Claim 5, Milliron discloses the modification comprise a soft-edge deformation (col. 4, lines 12-17).

Claim 7, Milliron discloses applying the modification by manipulation of a virtual tool (direct manipulation interface from the user input; col. 18, lines 14-15; col. 21, lines 37-39).

Claims 13, 14, Milliron teaches a translational displacement; rotational displacement (col. 13, lines 26-50).

Claim 15, Milliron teaches the modification function comprises a selected on of a displacement function (col. 4, lines 1-8), smoothing function (col. 30, lines 15-16), a warping function (col. 28, lines 39-47).

Claim 16, Milliron teaches a non-linear mathematical function (a discrete transformation computation; col. 17, lines 6-8).

Claim 17, Milliron discloses selecting a second modification function (the inverse of the modification function; col. 29, lines 24-26); applying an inverse function of the second modification to the modified array to produce a twice-modified array (parameterized transformations, strength fields, weighting fields for the inverse warp (a new warp), col. 29, lines 24-59); deducing (the set of scaled transformations is derived using the displacement method; col. 17, lines 66-67) from the modified array a modification of the geometrical shape (swapping the features has the effect of inverting the warp's parameterized transformations; col. 29, lines 54-63;) that would result from a direct application of the modification function to the array (the set of strength fields, and the set of weighting fields should evaluate to the same values on both the underformed model and deformed model, col. 29, lines 60-63; parameterized transformations may be constructed so that each point on a source feature corresponds to a single

transformation value that maps the point on the source feature to a corresponding point on the target feature (result from a direct application), col. 28, lines 48-52).

Claims 18, 19, Milliron teaches applying a constraint (the direct-manipulation constraints derived from the user input) to control a magnitude of a change of a geometrical shape (col. 18, lines 21-24); applying the constraint (parameterized transformations, strength fields, weighting fields) prevents at least one point of the geometrical shape from moving (swapping) in response to the inverse function (col. 29, lines 45-47).

Claim 20, Milliron teaches applying a surface texture to the geometrical shape (texture mapping; col. 20, lines 10-14).

Claims 21-24 and 26, the rationale provided in the rejection of claims 1-4 and 6 is incorporated herein.

Claims 25, 27, 30, 31, 33-40, the rationale provided in the rejection of claims 1-7, 10, 11, 13-20 is incorporated herein.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 12 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Milliron (6,608,631) in view of Stewart et al. (5,973,678).

Claims 12 and 32, Milliron does not teach a force field; however, Stewart et al. discloses a force field in consistent with a tool of arbitrary shape (col. 3, lines 1-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the a force feedback interface taught by Stewart into the modeling system of Milliron for calculating modification of a geometrical shape, because it would provide a method for manipulating a 3D object in a CAD environment utilizing a force feed back interface (col. 1, lines 61-63).

Allowable Subject Matter

7. Claims 8-11, 28 -31 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not teach the geometry shape is displaced away from the virtual tool, toward the virtual tool.

Response to Arguments

8. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

The rejections of claims have been modified in this Office action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Kimbinh Nguyen** whose telephone number is **(703) 305-9683**. The examiner can normally be reached **(Monday- Thursday from 7:00 AM to 4:30 PM and alternate Fridays from 7:00 AM to 3:30 PM)**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9306 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Part II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

May 5, 2004

Kimbinh Nguyen

Patent Examiner AU 2671